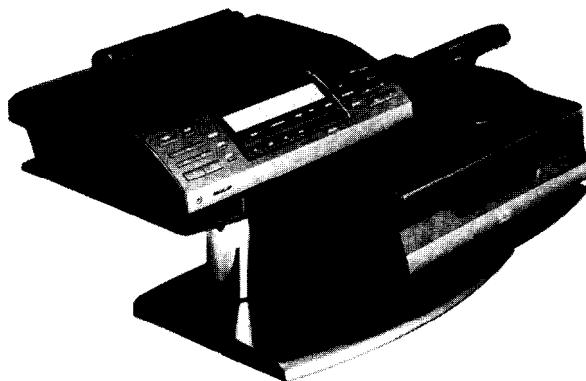


ONKYO SERVICE MANUAL

QUARTZ SYNTHESIZED TUNER AMPLIFIER MODEL RU-D1



Black and Silver models

BHUD, BHUDN, BHUDC	120V AC, 60Hz
BHUP, UP	230V AC, 50Hz
BHUW, UW	120/220V AC, 50/60Hz
BHUQA, UQA	240V AC, 50Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

TABLE OF CONTENTS

Specifications.....	2
Service procedures.....	3
Exploded view.....	4
Parts list.....	5
Packing views.....	6
Microprocessor descriptions.....	8
IC block diagram and descriptions.....	9
Block diagram.....	14
Adjustment procedures.....	15
Printed circuit board view from bottom side.....	17
Schematic diagram	
120V model.....	19
Other models.....	23
Printed circuit board view from bottom side.....	27
Printed circuit board-parts list.....	29
Schematic diagram OR-D1.....	31



SPECIFICATIONS

Tuner Amplifier RU-D1

Amplifier section

Power Output:	30 watts per channel, min. RMS, at 6 ohms, both channels driven, from 50 Hz to 20 kHz, with no more than 0.5 % THD.
Musical Power Output:	2 x 45 watts at 6 ohms, 1 kHz (DIN)
Continuous Power Output:	2 x 32 watts at 6 ohms, 1 kHz (DIN)
Total Harmonic Distortion:	0.5 % at rated power
IM Distortion:	0.5 % at rated power
Damping Factor:	55 at 8 ohms, 1 kHz (DIRECT)
Frequency Response:	40 – 20,000 Hz $\pm$ 3 dB (DIRECT)
Signal-to-Noise Ratio:	
CD/Tape:	100dB (IHF-A)
Tone Controls:	
Super Bass:	+18dB at 55Hz
Muting:	–45dB

Tuner Section

FM:

Tuning Range:	
European models:	87.5 – 108.0MHz (50kHz steps)
U.S.A. and Canadian models:	87.9 – 107.9MHz (200kHz steps)
Usable Sensitivity:	
Mono:	11.2 dBf, 1.0 μ V, 75 ohms 0.9 μ V (S/N 26dB, 40kHz Devi.) 75 ohms DIN
Stereo:	18.0dBf, 2.2 μ V, 75 ohms 32 μ V (S/N 46dB, 40kHz Devi.) 75ohms DIN
50dB Quieting Sensitivity:	
Mono:	18.2dBf, 2.2 μ V, 75 ohms
Stereo:	40.2dBf, 28 μ V, 75 ohms
Capture Ratio:	1.5dB
Image Rejection Ratio:	
European models:	85dB
U.S.A. and Canadian models:	50dB
IF Rejection Ratio:	90dB
Signal-to-Noise Ratio:	
Mono:	73dB
Stereo:	64dB
Selectivity:	
European models:	50dB DIN ($\pm$ 300kHz, 40kHz dev.)
U.S.A. and Canadian models:	55dB ($\pm$ 400kHz)
AM Suppression Ratio:	50dB
Harmonic Distortion:	
Mono:	0.20%
Stereo:	0.40%
Frequency Response:	30 – 15,000Hz $\pm$ 1.5dB
Stereo Separation:	33dB at 1kHz

AM:

Tuning Range:	
European models:	522 – 1611kHz (9kHz steps)
U.S.A. and Canadian models:	530 – 1710kHz (10kHz steps)
Saudi Arabia & Worldwide models:	531 – 1602kHz (9kHz steps)
Usable Sensitivity:	30 μ V
Image Rejection Ratio:	40dB
IF Rejection Ratio:	40dB
Signal-to-Noise Ratio:	40dB
Total Harmonic Distortion	0.8%

General

Power Supply:	
European models:	AC230V, 50Hz
U.S.A. and Canadian models:	AC120V, 60Hz
U.K. & Australian models:	AC 240V, 50Hz
Worldwide models:	120 and 220V switchable, 50/60Hz
Dimensions (W x H x D):	295 x 83.0 x 335 mm 11-5/8" x 3-2/8" x 13-3/16"
Weight:	4.3kg. (9.4lbs.)

SERVICE PROCEDURES

1. Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

Circuit no.	Part no.	Description
F901	252149	△ 2.5A-TSC, Primary fuse<D>
F901	252070	△ 1A-SE-EAK, Primary fuse <P/Q>
F902	252070	△ 1A-SE-EAK, Primary fuse<W>
F903	252149	△ 2.5A-TSC, Primary fuse<W>

NOTE:<D>:Only 120V model

<P>:Only 230V model

<W>:Only Worldwide model

<Q>:Only 240V model

2. Change of FM/AM band step.

With the exception of the Worldwide model, a BAND STEP selector switch is not provided.

(FM)

BAND STEP	R747	J711
200kHz→50kHz	Addition	Open
50kHz→200kHz	Eliminated	Short

(AM)

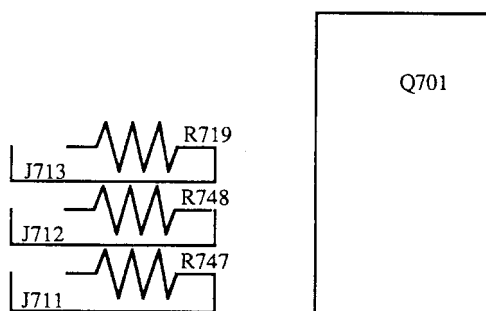
BAND STEP	R748	J712
10kHz→9kHz	Eliminated	Short
9kHz→10kHz	Addition	Open

In R747 and R748 Carbon resistor 47kΩ
(Part No.41734473) are used.

—Worldwide model—

Worldwide models are equipped with a step band selector switch. This switch is located on the back panel. This switch is set to 50kHz(FM)and 9kHz(AM)at the factory, but may have to be reset to 200kHz and 10kHz depending on the area where the unit is used.

	De-emphasis	FM step	AM step
Europe:	50 μsec	50kHz	9kHz
U.S.A.:	75 μsec	200kHz	10kHz



NADG-4403

3. Memory preservation

This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory the power switch must be turned on and off a few times each month to keep the back-up system operative. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

4. Safety-check out

(Only U.S.A. model)

After correcting the original service problem perform the following safety check before releasing the set to the customer.

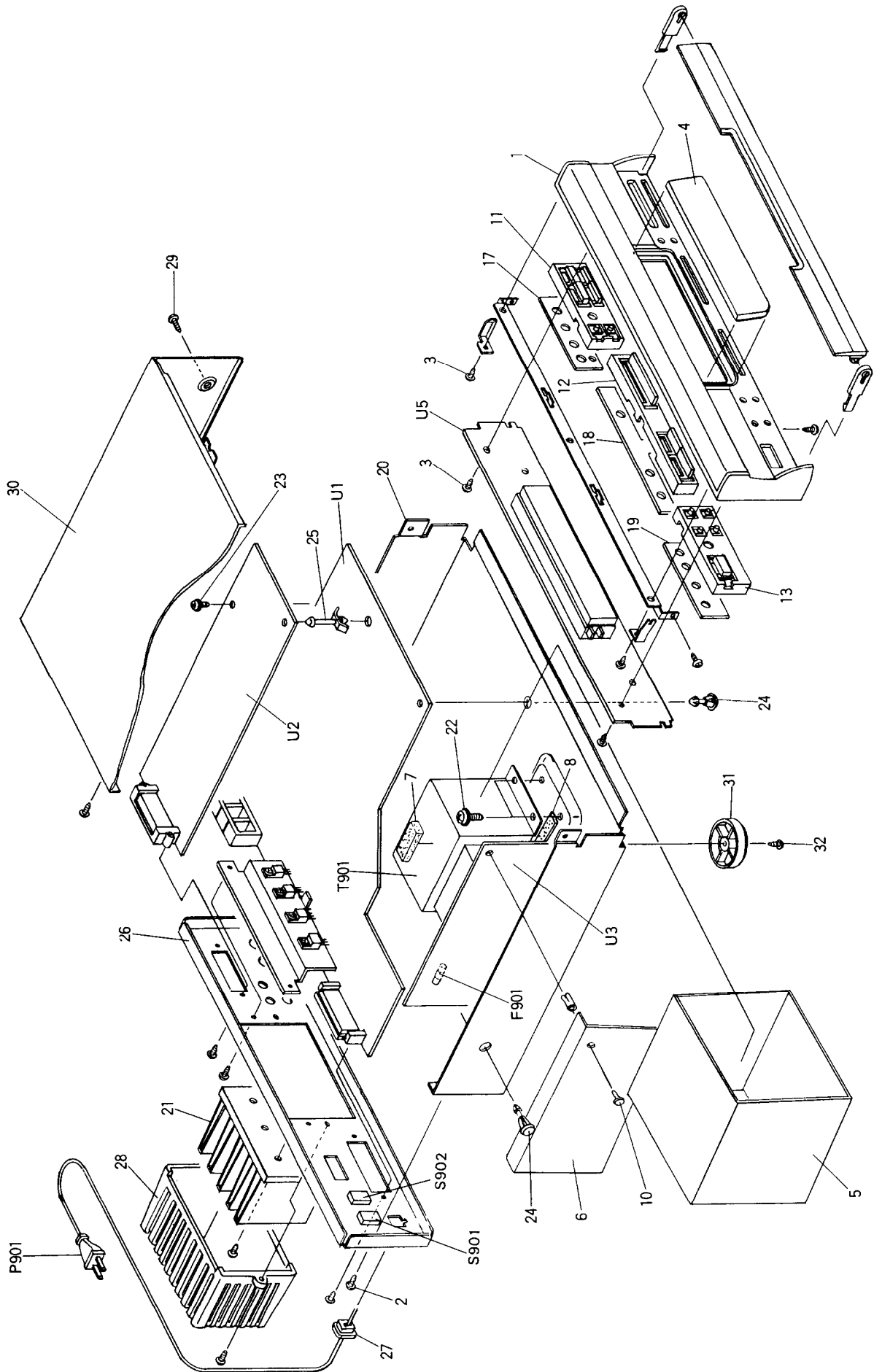
Connect the insulating-resistance tester between the plug of power supply cord and terminal GND on the back panel. Specifications: 3.3 Mohm ±10% at 500V.

5. Change of voltage

Worldwide models are equipped with a voltage selector to conform with local power supplies. This switch is located on the back panel. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

This switch is set to 220V at the factory. Voltage is changed by sliding the groove in the switch with the screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.

EXPLODED VIEW



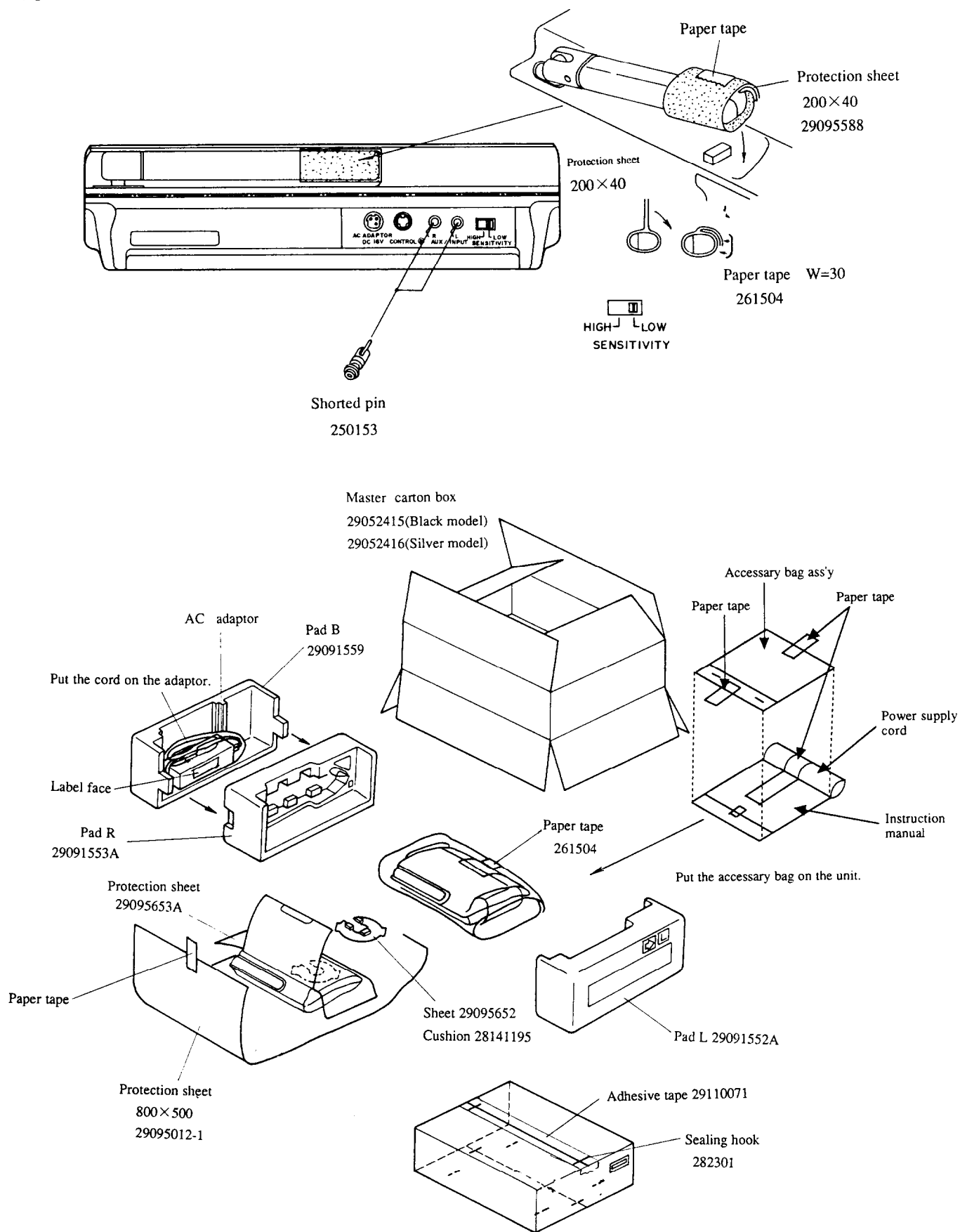
PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
1	27100699B	Front bracket 	F901	252149	⚠ 2.5A-TSC,Primary fuse <D>
2	27100700B	Front bracket <S>	F902	252070	⚠ 1A-SE-EAK,Primary fuse <P/Q>
3	834430088	3TTS+8B(BC),Self-tapping screw	F903	252070	⚠ 1A-SE-EAK,Primary fuse <W>
4	833430080	3TTP+8P(BC),Self-tapping screw	P901	252149	⚠ 2.5A-TSC,Primary fuse <W>
	28191636	Clear plate 		253123,	⚠ AS-UC-6 #18,
	28191618	Clear plate <S>		253146 or	⚠ Power supply cord <D>
6	27150343B	Shield plate		253161	⚠
7	28141192	Cushion		253149 or	⚠ AS-CEE,
8	28141086	Cushion		253175	⚠ Power supply cord <P/W>
10	880023	Plastic rivet		253118	⚠ AS-SAA,Power supply cord <Q>
11	28324525	Knob,volume 	S901	25065340	⚠ NSS-0001,Power switch <P/W/Q>
	28324559	Knob,volume <S>	S902	25065123	⚠ NSS-1258P,Voltage selector switch <W>
12	28324526	Knob,selector 	T901	2300808A	⚠ NPT-1139D,Power transformer <D>
	28324560	Knob,selector <S>		2300809A	⚠ NPT-1139P,Power transformer <P>
13	28324527	Knob,power 		2300810A	⚠ NPT-1139DG,Power transformer <W>
	28324561	Knob,power <S>		2300811A	⚠ NPT-1139Q,Power transformer <Q>
17	27150332	Shield plate,volume	U1	1A362599-2	NAAF-4399-2,Main circuit pc board ass'y <D>
18	27150331	Shield plate,selector		1A362599-2A	NAAF-4399-2A,Main circuit pc board ass'y <P/W/Q>
19	27150330	Shield plate,power	U2	1A362500-2	NARF-4400-2,Tuner circuit pc board ass'y <D>
20	27100254B	Chassis		1A362500-2A	NARF-4400-2A,Tuner circuit pc board ass'y <P/Q>
21	27160305	Radiator		1A362500-2B	NARF-4400-2B,Tuner circuit pc board ass'y <W>
22	830440089	4TTC+8C(BC),Self-tapping screw	U3	1A362501-2	NAPS-4401-2,Power supply circuit pc board ass'y <D>
23	831130088	3TTW+8B,Self-tapping screw		1A362501-2A	NAPS-4401-2A,Power supply circuit pc board ass'y <P/Q>
24	27190428A	KGLS-10RT,holder		1A362501-2B	NAPS-4401-2B,Power supply circuit pc board ass'y <W>
25	27190607	KGLS-16S,Holder	U5	1A362503-2	NADG-4403-2,Fluorescent indicator tube pc board ass'y <D>
26	27121587A	Back panel <D>		1A362503-2A	NADG-4403-2A,Fluorescent indicator tube pc board ass'y <P/Q>
	27121588	Back panel <P/Q>	U6	1A362503-2B	NADG-4403-2B,Fluorescent indicator tube pc board ass'y <W>
	27121590	Back panel <V>		1A362596-2	NAETC-4496-2,Band switch pc board ass'y <W>
	27121589	Back panel <W>			
27	27300750	⚠ #2271,Cord,bushing			NOTE:<D>:120V model only
28	28184510	Cover,radiator			<P>:230V model only
29	834430088	3TTS+8B(BC),Self-tapping screw			<W>:Worldwide model only
30	28184499	Top cover			<Q>:240V model only
31	27175253-1Y	Leg			<V>: Germany model only
32	834430088	3TTS+8B(BC),Self-tapping screw			:Black model only
41	29361414	Label,rating <P>			<S>:Silver model only
	29361415	Label,rating <S><V>			
	29361416	Label,rating <W>			
	29361417	Label,rating <Q>			

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE
CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK.
REPLACE ONLY WITH PART NUMBER SPECIFIED.

PACKING VIEWS

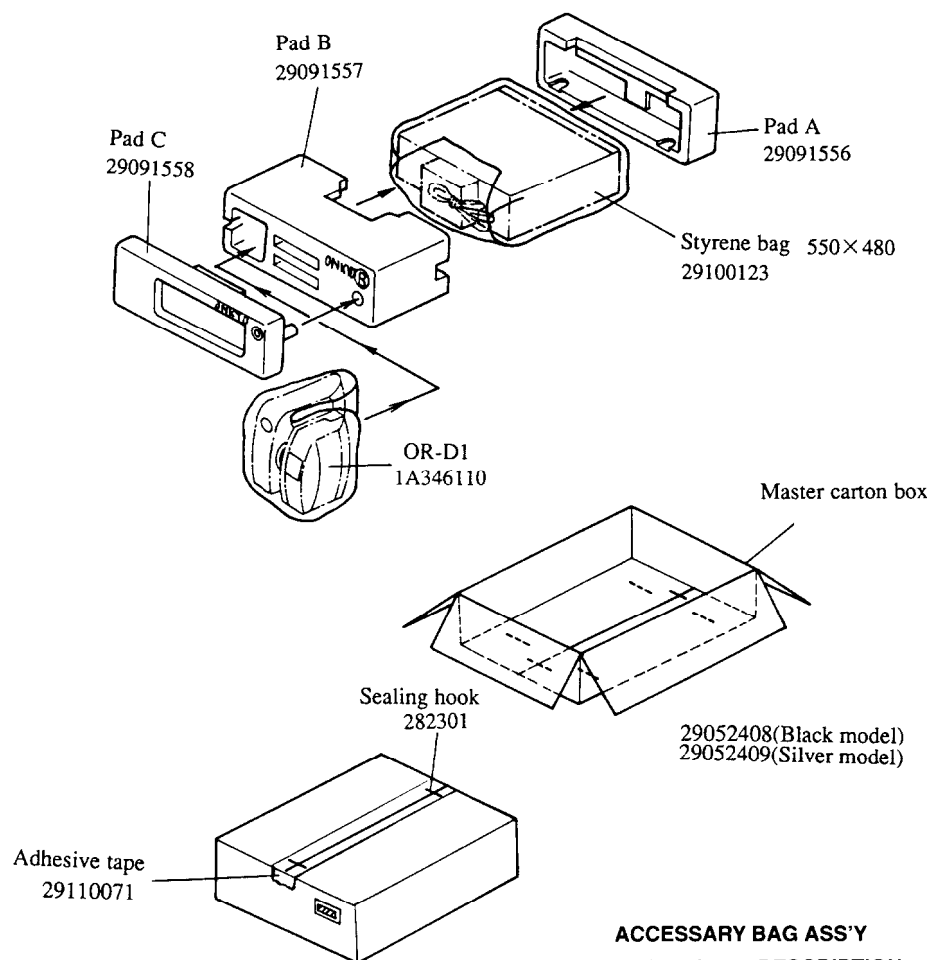
TU-D1



RU-D1

Insert the shorted pins (Part No. 250153) to the terminal PLAY of DAT.

Put the accessory bag ass'y on the unit.(230V model only)



ACCESSORY BAG ASS'Y

PART NO.	DESCRIPTION
29341735	Instruction manual
29341736	Instruction manual (230V/Worldwide models)
29341737	Instruction manual (230V/Worldwide models)
29100006A	350×250mm, Styrene bag
2010209	Plug 8P
2010273	Connection cord 9P
292111	FM antenna (120V model)
292112	FM antenna (230V/Worldwide/240V models)
25060123 or	
25065462	FM antenna adaptor (Worldwide model)
25055018	CV-K-1, Conversion plug (Worldwide model)
232140	NMA-3057, AM loop antenna
253177HIT	P34-SPT-2-C0024, Power supply cord (120V model)
253183HAN	SXA3016UP, Power supply cord (230V/Worldwide models)
253184HAN	SC-323-J04, Power supply cord (240V model)
29365019A	Warranty card (U.S.A. model)
29365020F	Warranty card (Germany model)
29365020F	Warranty card (French model)
29358002J	Service station list (U.S.A. model)
29100094A	Bag for warranty card (Germany model)
29100107	Bag for warranty card (French model)

MICROPROCESSOR DESCRIPTIONS

No.	Mark	Function	Descriptions
1,2	P10,P11		Not used.Connect to the ground.
3	P12	CE	Connect to the terminal CE of the function switch LC7821N and the terminal CE of the electro volume LC7536.
4	P13	DATA	Connect to the terminal DI of the function switch, the terminal DATA of PLL IC LM7001 and the terminal CE of the electro volume.
5	P14	CL	Connect to the terminal CL of the function switch, the terminal CL of PLL IC and the terminal CL of the electro volume.
6	P15	PLL	Connect to the terminal CE of the PLL IC.
7	P16	SEL MUT	Muting output when the source button is operated.
8	P17	TU MUT	Muting output terminal of tuner section.Active H.
9	TEST		Test terminal.Connect to the ground.
10,11	P21,P22		Not used.Connect to the ground.
12	RESET		Reset signal input terminal.
13	XIN		Crystal connection terminal.
14	XOUT		Connect the 8MHz crystal oscillator.
15	VSS		Ground terminal.
16	P20	POFF	This is the input terminal for detection of the stoppage of electric current. L when the stoppage of electric current.
17	P30	AUTO/MONO	AUTO/MONO selection output terminal.H when AUTO. L when other position.
18	P31	STEREO	Stereo broadcast detection input terminal.Active L.
19	P32	NOISE	Control the STEREO indicator.
20	P33	SD	Noise detection input terminal.
21,22	P34,P35		Not used.
23	P36	SYS OUT	Broadcast detection input terminal.Active L.
24	P37	SYS IN	Control the stop of auto tuning and muting output.
25	P00		Not used.Connect to the ground.
26	P01	RELAY	System code output terminal.Active L.
28	P03	POWER	System code input terminal.Active L.
29	P04	PROTECT	Not used.Connect to the ground.
30,31	P05,P06		Speaker relay control output.
32	P07	WAKE-UP	Power source control output.High level when the power switch turns on.
33	VDD		Detection input of protection circuit .Active H.
34	P60	VDD	Not used.Connect to the ground.
35-39	P61-P65		Warm-up output terminal of control center.Output the high level signal of 100 msec. when the power source of receiver turns on.
			Not used.Connect to the ground.
			Power supply terminal.
			Not used.Connect to the ground.

No.	Mark	Function	Descriptions
40,41	P66,P67	10G,9G	Digit output terminal.
42-49	P70-P77	8G-1G	Digit output terminal.
50-57	P80-P87	P10-P3	Segment output terminal.
58,59	P90-P91	P2	Segment output terminal.
60-65	P92-P97	P16-P11	Segment output terminal.
66	VKK	VKK	Power supply terminal for driver of FL tube.
67	P40	BAND0	Initializing input terminal for the region of FM band.
68	P41	BAND1	
69	P42	AM10K	Initializing input terminal for the region of AM band.
70	P43	MODE	Initializing input terminal for the model.
71	P44	FADJ	Frequency adjustment mode input terminal of crystal oscillator.Active H.
72-74	P45-P47		Not used. Connect to the ground terminal.
75	P50	K1	Key input terminal.
76	P51	K0	Key input terminal.
77	P52	RIN	Signal input terminal of right channel which is indicated the level meter.
78	P53	LIN	Signal input terminal of left channel which is indicated the level meter.
79	P54		Not used. Connect to the ground terminal.
80	P55	FOUT	Output terminal for frequency adjustment of crystal oscillator.
			Output 500 kHz signal when terminal FADJ is the high level.

FM band setting

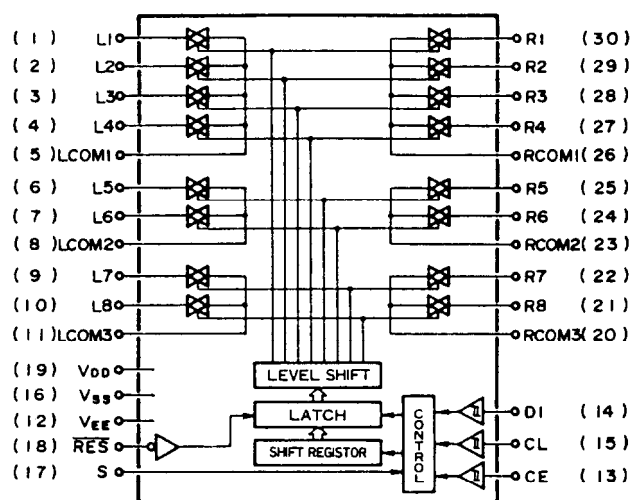
BAND1	BAND0	REGION	FREQUENCY RANGE	CH. SPACE
1	1	U.S.A.	87.9-107.9MHz	200kHz
0	1	Europe	87.50-108.00MHz	50kHz
1	0	Saudi Arabia	87.50-108.00MHz	50kHz
0	0	Japan	76.0-90.0MHz	100kHz

AM band setting

AM10K	REGION	FREQUENCY RANGE	CH. SPACE
1	U.S.A.	530-1710kHz	10kHz
0	Saudi Arabia	531-1602kHz	9kHz
0	Europe	522-1611kHz	9kHz

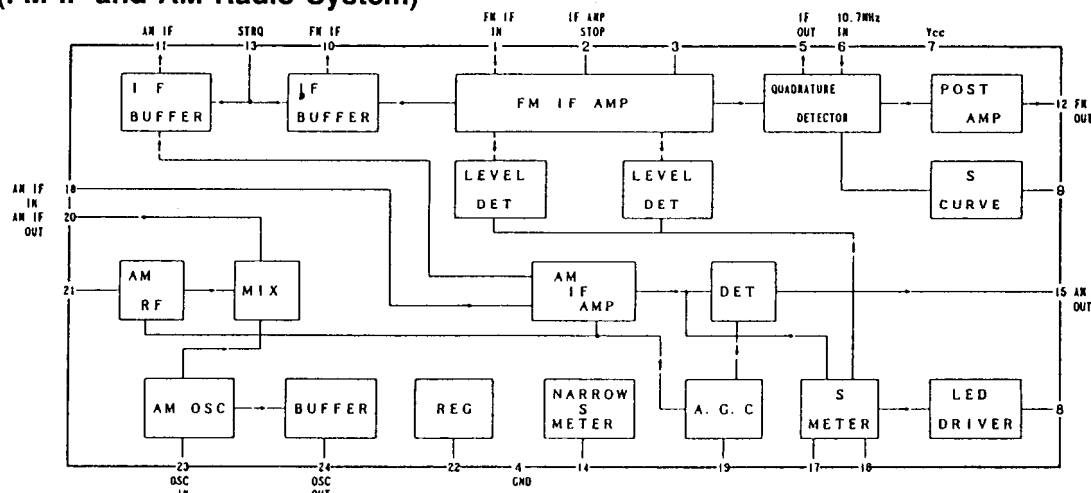
IC BLOCK DIAGRAMS AND DESCRIPTIONS

LC7821N (Analogue switch)

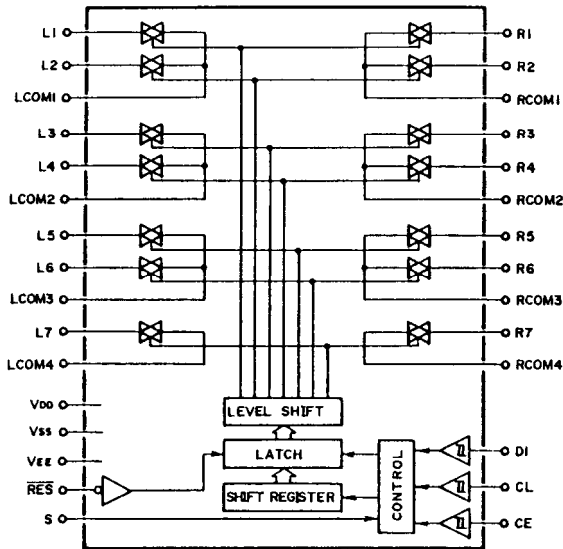


Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	TUNER	Input/output terminals of audio signal of left channel.	30	TUNER	Input/output terminals of audio signal of right channel.
2	REC		29	REC	
3	DAT REC		28	DAT REC	
4	DAT PB		27	DAT PB	
5	LCOM 1		26	RCOM 1	
6	DIN REC		25	DIN REC	
7	DIN PB		24	DIN PB	
8	LCOM 2		23	RCOM 2	
9	NC		22	NC	
10	NC		21	NC	
11	LCOM 3		20	RCOM 3	
12	Vss	Negative power supply terminal (-15V)	19	VDD	Positive power supply terminal.(+15V)
13	CE	Chip enable terminal. Connect to the terminal SEL of microprocessor.	18	RES	Reset terminal. When power is turned on, the condition of the analog switch is not determined. When this terminal is "L", all analog switches are off.
14	DI	Serial data input terminal. Connect to the terminal DATA of microprocessor.	17	S	Selector terminal
15	CL	Serial clock input terminal. Connect to the terminal CLOCK of microprocessor.	16	Vss	Ground terminal

LA1266 (FM IF and AM Radio System)



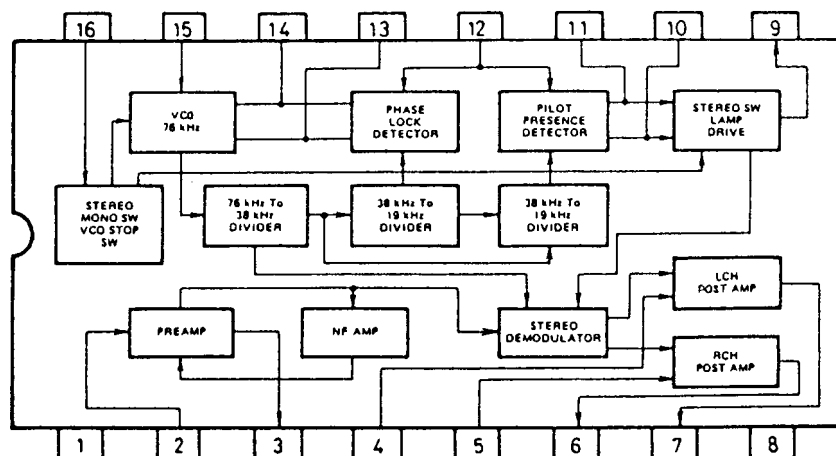
LC7823N (Analogue switch)



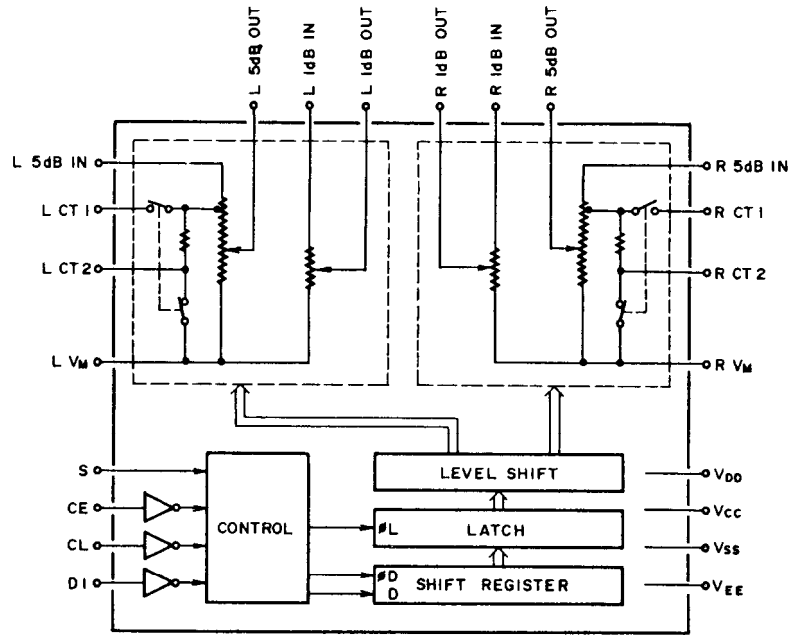
TONE	TONE SWITCH							LC7536
PATTERN	1	2	3	4	5	6	7	LOUDNESS
DIRECT+ S.BASS	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF
HEAVY+ S.BASS	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
CLEAR+ S.BASS	OFF	ON	OFF	ON	OFF	ON	ON	OFF
SOFT+ S.BASS	ON	OFF	ON	OFF	OFF	ON	ON	OFF
VOCAL+ S.BASS	ON	OFF	OFF	ON	ON	OFF	ON	OFF
DIRECT	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
HEAVY+(DIRECT)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
CLEAR+(DIRECT)	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
SOFT+(DIRECT)	ON	OFF	ON	OFF	OFF	ON	OFF	OFF
VOCAL+(DIRECT)	ON	OFF	OFF	ON	ON	OFF	OFF	OFF

Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	TONE 1	Tone control terminals. Control the inside analogue switch at the serial data.	30	TONE 1	Tone control terminals. Control the inside analogue switch at the serial data.
2	TONE 2		29	TONE 2	
3	LCOM1		28	RCOM1	
4	TONE 3		27	TONE 3	
5	TONE 4		26	TONE 4	
6	LCOM 2		25	RCOM 2	
7	TONE 5		24	TONE 5	
8	TONE 6		23	TONE 6	
9	LCOM 3		22	RCOM 3	
10	TONE 7		21	TONE 7	
11	LCOM 4		20	RCOM 4	
12	Vss	Negative power supply (-15V)	19	VDD	
13	CE	Chip enable terminal. Connect to the terminal SEL of microprocessor.	18	RES	Reset terminal. When power is turned on, the condition of the analog switch is not determined. When this terminal is "L", all analog switches are off.
14	DI	Serial data input terminal. Connect to the terminal DATA of microprocessor.	17	S	Selector terminal
15	CL	Serial clock input terminal. Connect to the terminal CLOCK of microprocessor.	16	Vss	Ground terminal

AN7470 (FM Stereo Decoder)

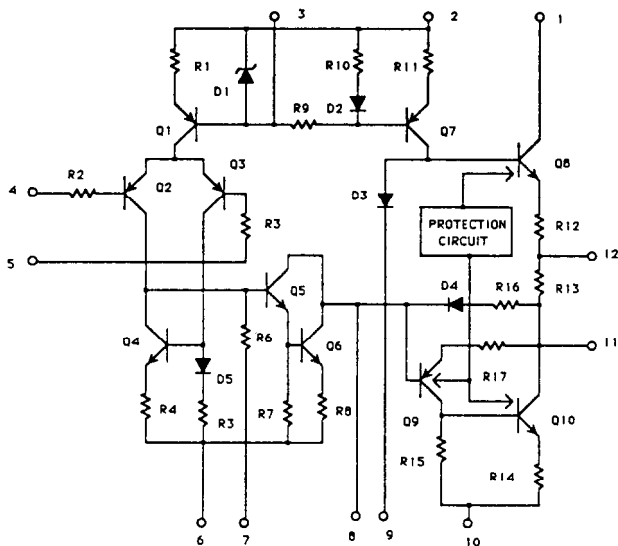


LC7536 (Electro Volume)

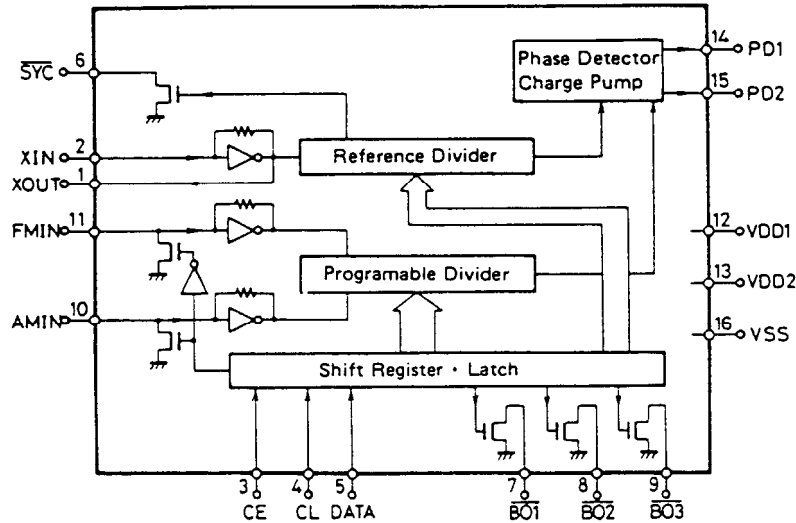


No.	TERMINAL	DESCRIPTION	No.	TERMINAL	DESCRIPTION
1	L 5dB IN	5dB step attenuator input terminal	17	CL	Serial data input terminal
3	L CT1	Terminal for loudness	18	DI	Serial data input terminal
4	L CT2	Terminal for loudness	19	CE	Serial data input terminal
5	L 5dB OUT	5dB step attenuator output terminal	21	VCC	Power supply terminal
6	L 1dB IN	1dB step attenuator input terminal	22	R VM	Common terminal of volume
8	L 1dB OUT	1dB step attenuator output terminal	23	R 1dB OUT	1dB step attenuator output terminal
9	L VM	Common terminal of volume	25	R 1dB IN	1dB step attenuator input terminal
10	VEE	Power supply terminal	26	R 5dB OUT	5dB step attenuator output terminal
12	S	Select terminal of address code during data format	27	R CT2	Terminal for loudness
13	VDD	Power supply terminal	28	R CT1	Terminal for loudness
14	VSS	Power supply terminal	30	R 5dB IN	5dB step attenuator input terminal

μPC1225H (Power Amplifier Driver)

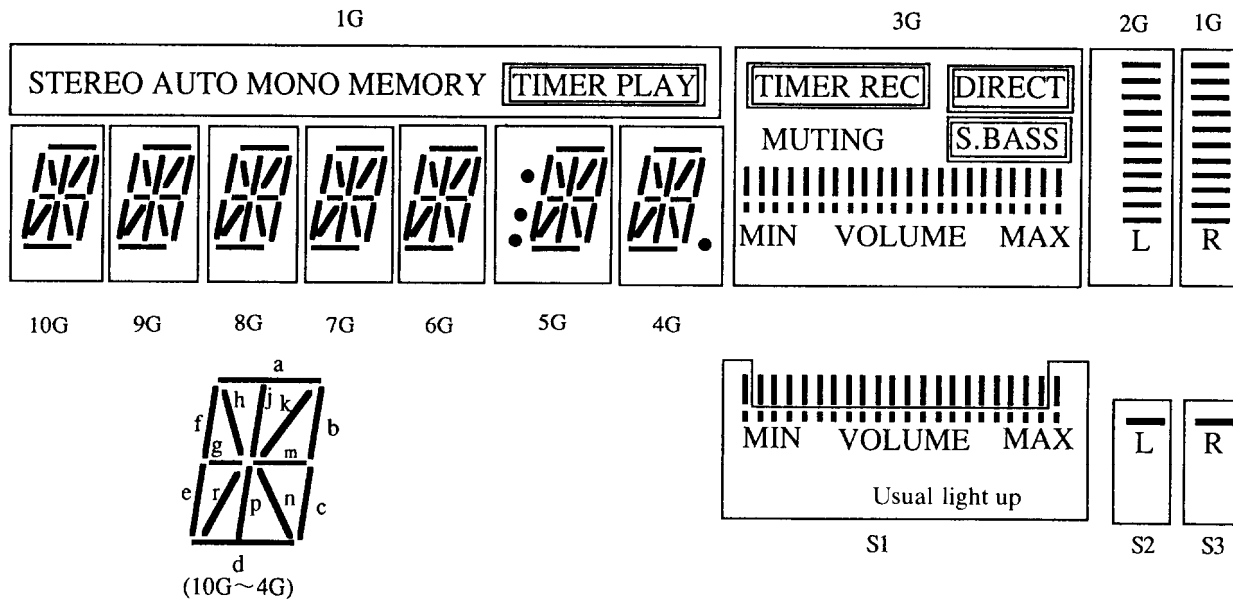


LM7001 (PLL Synthesizer and Controller)



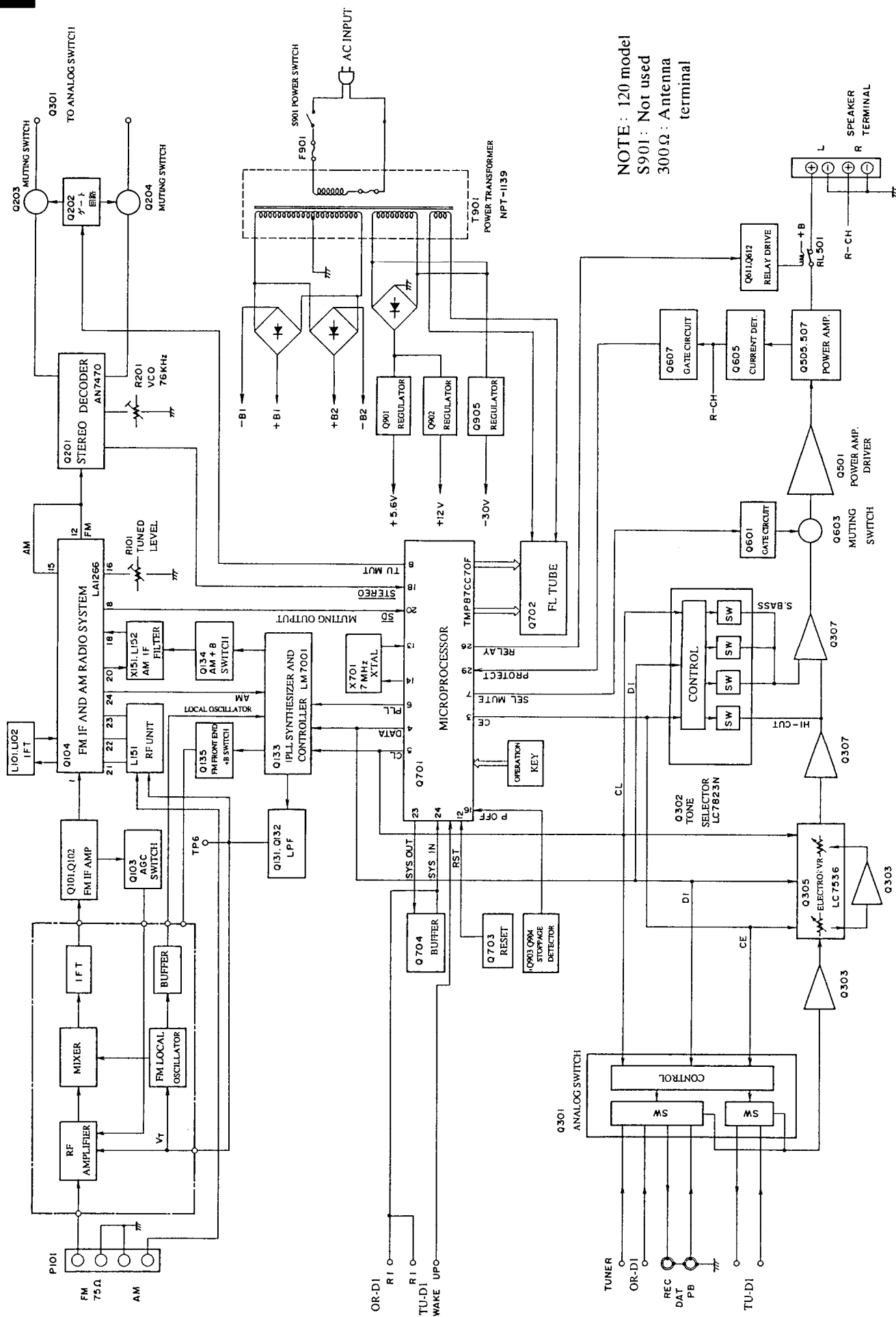
Pin No.	Terminal	Description
1	XOUT	Connect to the 7.2 MHz crystal oscillator.
2	XIN	
3	CE	Chip enable terminal. Connect to the PLL terminal of microprocessor.
4	CL	Serial clock input terminal. Connect to the CLOCK terminal of microprocessor.
5	DATA	Serial data input terminal. Connect to the DATA terminal of microprocessor.
6	$\overline{\text{SYN}}$	Not used.
7	$\overline{\text{AUTO/MONO}}$	AUTO/MONO selection output terminal. "L" when AUTO.
8	$\overline{\text{FM}}$	FM band control output terminal. "L" when FM.
9	$\overline{\text{AM}}$	AM band control output terminal. "L" when AM.
10	AMIN	AM local oscillator input terminal.
11	FMIN	FM local oscillator terminal.
12	VDD 1	Power supply terminal for back-up.
13	VDD 2	Power supply terminal.
14	PD1	Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided local oscillator frequency is high than the reference frequency. In the opposite case, low level is output. Floating occurs when the frequencies matched. The output is applied to the variable capacitor diode in the local oscillator through the low pass filters.
15	PD2	
16	Vss	Ground terminal.

BJ017GK (Fluorescent Indicator Tube)



	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
P1	a	a	a	a	a	a	a	B1	a	a
P2	b	b	b	b	b	b	b	B2	B2	B2
P3	c	c	c	c	c	c	c	B3	B3	B3
P4	d	d	d	d	d	d	d	B4	B4	B4
P5	e	e	e	e	e	e	e	B5	B5	B5
P6	f	f	f	f	f	f	f	B6	B6	B6
P7	g	g	g	g	g	g	g	B7	B7	B7
P8	h	h	h	h	h	h	h	B8	B8	B8
P9	j	j	j	j	j	j	j	B9	B9	B9
P10	k	k	k	k	k	k	k	B10	B10	B10
P11	m	m	m	m	m	m	m	-	-	TIMER PLAY
P12	n	n	n	n	n	n	n	S.BASS	-	MEMORY
P13	p	p	p	p	p	p	p	MUTING	-	MONO
P14	r	r	r	r	r	r	r	DIRECT	-	AUTO
P15	-	-	-	-	-	:	-	TIMER REC	-	STEREO
P16	-	-	-	-	-	○	○	S1	S2	S3

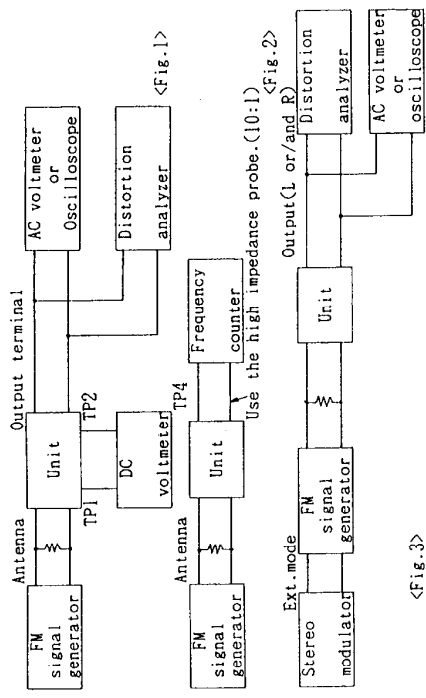
BLOCK DIAGRAM



ADJUSTMENT PROCEDURES

FM section

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Tuning frequency	Output indicator	Adjustment point	Adjust for	Remarks
FM IF/RF	1					DC voltmeter	L101	0±30V	FM MUTE/MODE switch. MONO
	2	Fig. 1	99.1MHz 1kHz, 75kHz devi. 65dB (60dB)		99.1MHz	AC voltmeter	IFT on the front end	Maximum	Repeat the steps 1 and 3 until no further adjustment is necessary.
	3					Distortion analyzer	L102	Minimum	
Muting Level		Fig. 3	99.1MHz 17.2dB (12dB) (120V model) 19.2dB (14dB) (Other model)		99.1MHz	Oscilloscope	R101	Signal output	Remove the carbon resistor R102 when you are not able to adjust.
VCO		Fig. 2	99.1MHz 1kHz, 75kHz devi. 65dB (60dB)		99.1MHz	Frequency counter	R201	19kHz±10Hz	
Stereo Distortion		Fig. 3	99.1MHz, Ext. mod., 65dB (60dB)	Channel L or R 1kHz	99.1MHz	Distortion analyzer	IFT on the front end	Minimum	Don't turn more than ±180°



<Fig. 1>

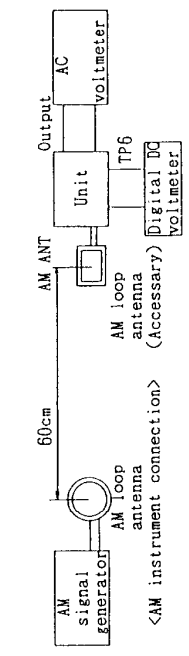
<Fig. 2>

AM section

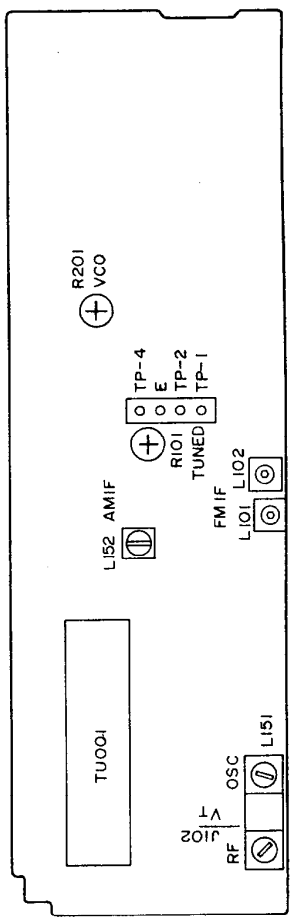
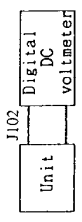
Step	AM SG output	Tuning frequency	Output indicator	Adjustment point	Adjust for
1		530kHz (522kHz)	Digital DC voltmeter	OSC coil on RF block L151	(1.5±0.1V)
2	600kHz (603kHz) 400Hz, 30% mod. 60dB/m	600kHz (603kHz)	AC voltmeter	RF coil on RF block L151	Maximum
3	990kHz 400Hz, 30% mod. 60dB/m	990kHz	AC voltmeter	L152	Maximum

Reference Specifications
FM tuned voltage: 87.9MHz 1.8±0.5V } 120V model
107.9MHz 7.3±0.5V }
AM tuned voltage: 87.5MHz 1.8±0.5V } Other models
108.0MHz 7.3±0.5V }
530kHz 1.5±0.5V } 120V model
1710kHz 8.0±0.5V }
522kHz 1.3±0.5V } 1230/240 models
1611kHz 7.5±0.5V }
531kHz 1.5±0.5V }
1602kHz 7.5±0.5V } Worldwid models
Auto stop level: AM: Less than 65dB/m
FM: Less than 20dB/μ

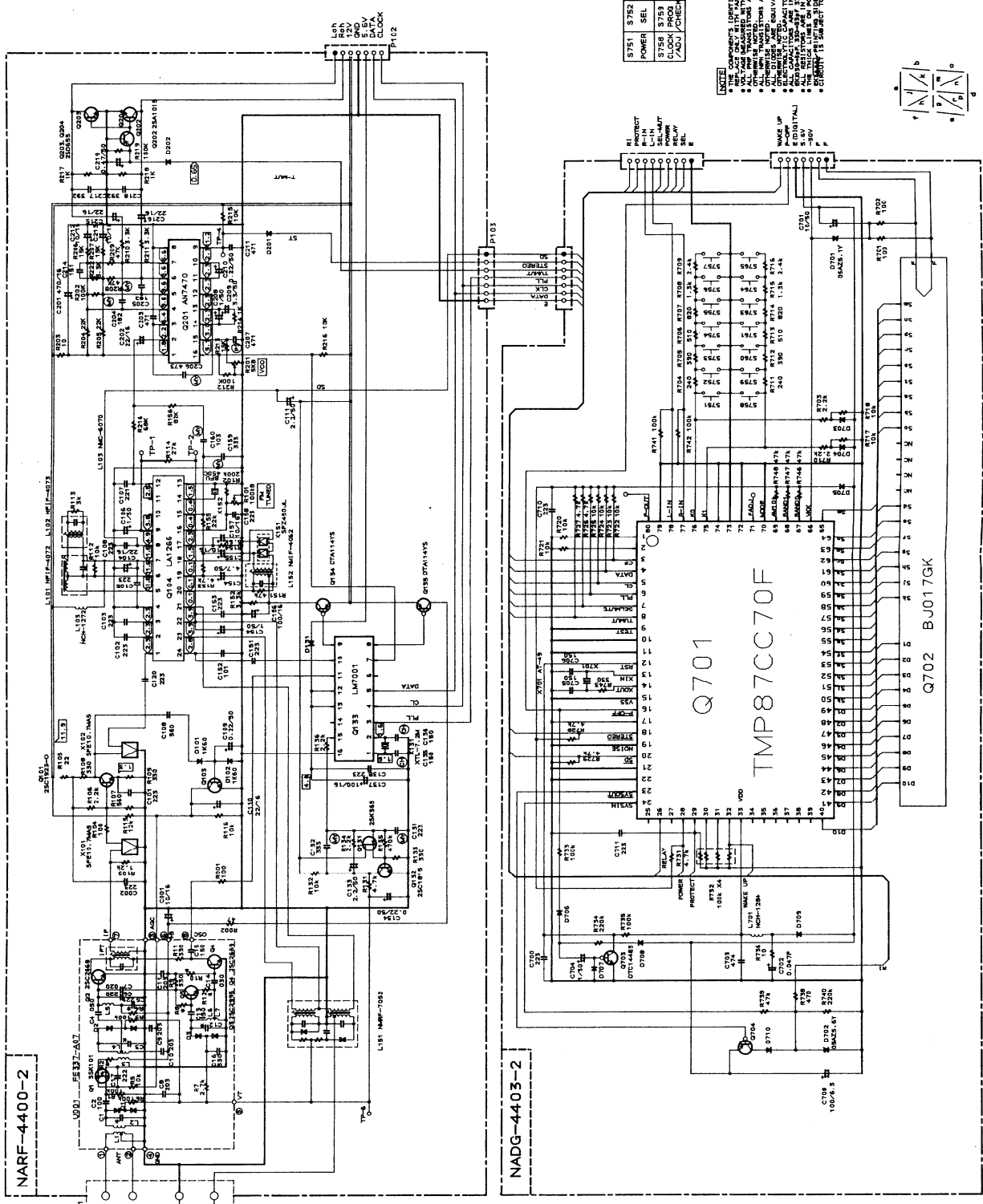
() 9kHz step model



Confirmation of tuned voltage

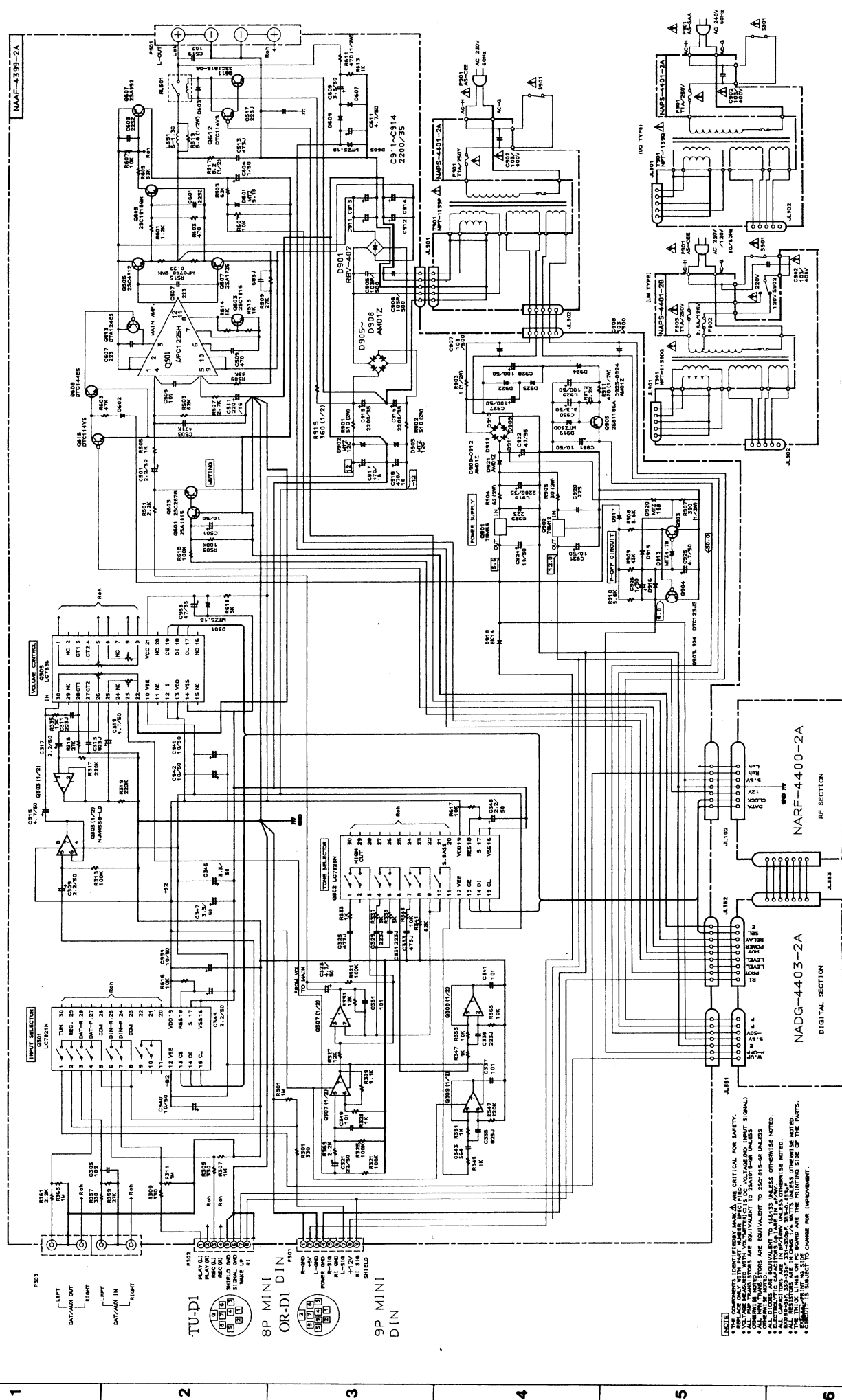


SCHEMATIC DIAGRAM
TUNER SECTION —120V model—



SCHEMATIC DIAGRAM

AMPLIFIER SECTION — Other models —



ONKYO CORPORATION

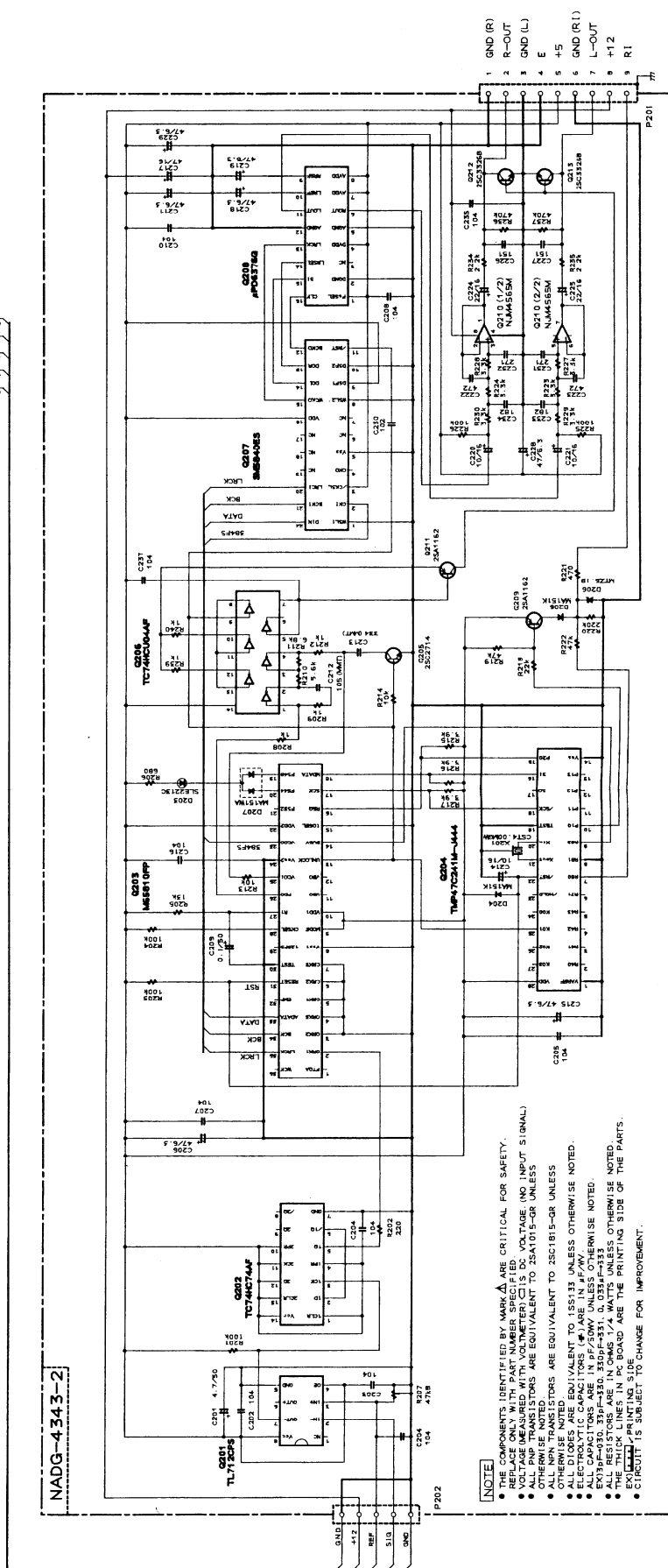
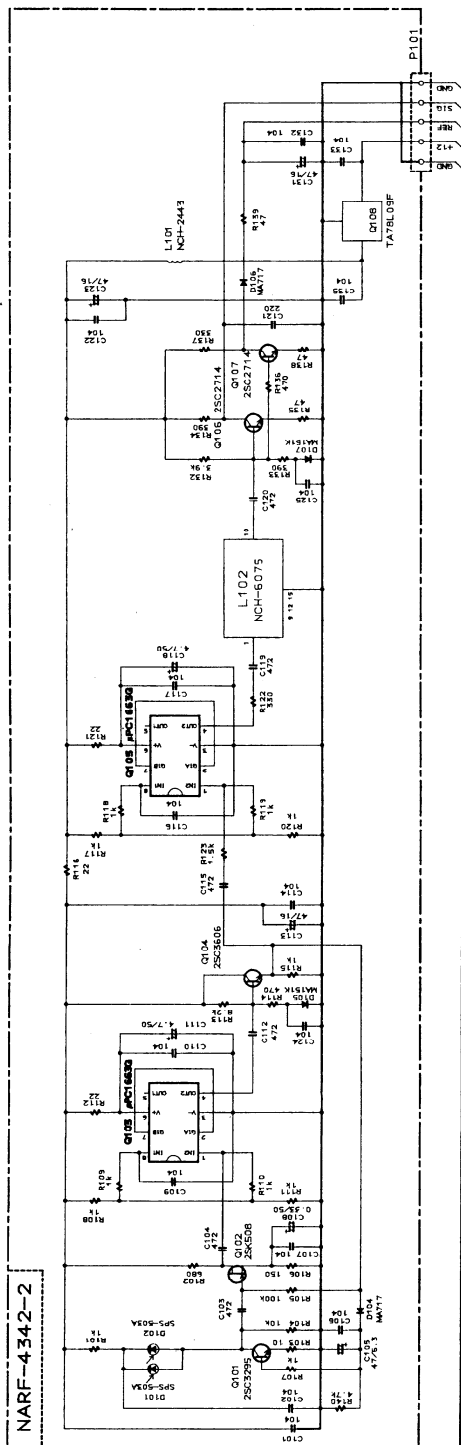
PRINTED CIRCUIT BOARD PARTS LIST

MAIN CIRCUIT PC BOARD(NAAF-4399-2/2A)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
				Capacitors	
	ICs		C309,C310	393180227	2.2 μ F,50V,Elect.
Q301	22240280	LC7821N	C311,C312	371122234	0.022 μ F $\pm$ 5%,50V,Mylar
Q302	22240339	LC7823N	C313,C314	371128234	0.082 μ F $\pm$ 5%,50V,Mylar
Q303,Q304	22240293	NJM4558L-D	C315,C316	393180477	4.7 μ F,50V,Elect.
Q305	22240468	LC7536	C317,C318	393180227	2.2 μ F,50V,Elect.
Q307-Q310	22240293	NJM4558L-D	C319,C320	393180477	4.7 μ F,50V,Elect.
Q501,Q502	22240108	μ PC1225H	C321,C322	393180227	2.2 μ F,50V,Elect.
Q901	222780565	78M56	C323,C324	393180477	4.7 μ F,50V,Elect.
Q902	222780125	78M12HF	C325,C326	371124724	4700pF $\pm$ 5%,50V,Mylar
	Transistors		C329-C332	371122234	0.022 μ F $\pm$ 5%,50V,Mylar
Q503,Q504	2211255	2SC1815-GR	C333,C334	371124734	0.047 μ F $\pm$ 5%,50V,Mylar
Q505,Q506	2202303,	* 2SC4512-O,	C335,C336	371128234	0.082 μ F $\pm$ 5%,50V,Mylar
	2202304 or	* 2SC4512-Y or	C339,C340	371122234	0.022 μ F $\pm$ 5%,50V,Mylar
	2202305	* 2SC4512-P	C343,C344	374725644	0.56 μ F $\pm$ 5%,50V,Plastic
Q507,Q508	2202313,	* 2SA1726-O	C345-C348	393180227	2.2 μ F,50V,Elect.
	2202314 or	* 2SA1726-Y or	C501,C502	393180227	2.2 μ F,50V,Elect.
	2202315	* 2SA1726-P	C507,C508	371122234	0.022 μ F $\pm$ 5%,50V,Mylar
Q601	2211455	2SA1015-GR	C511,C512	393142217	220 μ F,16V,Elect.
Q603,Q604	2212285 or	2SC2878-A or	C513,C514	371124734	0.047 μ F $\pm$ 5%,50V,Mylar
	2212286	2SC2878-B	C515,C516	371126834	0.068 μ F $\pm$ 5%,50V,Mylar
Q605,Q606	2211255	2SC1815-GR	C519,C520	371121024	1000pF $\pm$ 5%,50V,Mylar <P/W>
Q607	2211792 or	2SA992-F or	C604	393180107	1 μ F,50V,Elect.
	2211793	2SA992-E	C605	393181007	10 μ F,50V,Elect.
Q608	221282	DTC144ES	C609,C610	393180337	3.3 μ F,50V,Elect.
Q611	2211255	2SC1815-GR	C611,C612	393180477	4.7 μ F,50V,Elect.
Q612,Q615	221281	DTC114YS	C911-C916	391962227	<u>2200 μ F,35V,Elect.</u>
Q613,Q614	2212600	DTA124ES	C917,C918	393144717	470 μ F,16V,Elect.
Q903,Q904	2213640	DTC123JS	C919	391962227	2200 μ F,35V,Elect.
Q905	2202024 or	2SB1186A-D or	C921,C924	393181007	10 μ F,50V,Elect.
	2202025	2SB1186A-E	C922,C933	393164707	47 μ F,35V,Elect.
	Diodes		C925	393180477	4.7 μ F,50V,Elect.
D301,D601	224450512	MTZ5.1B	C926	393180107	1 μ F,50V,Elect.
D602,D603	223163 or	1SS133 or	C927-C929	393181017	100 μ F,50V,Elect.
D607-D610	223205	1SS270A	C930	393180337	3.3 μ F,50V,Elect.
D605,D606	224450512	MTZ5.1B	C931	393181007	10 μ F,50V,Elect.
D901	22380022	RBV402	C939-C942	393181007	10 μ F,50V,Elect.
D902,D903	224451203	MTZ12C		Resistors	
D905-D912	22380046	AM01Z	R515,R516	4500027	0.22ohm,2W,Metal plate
D913	224450472	MTZ4.7B	R905	441723004	30ohm,2W,Metal oxide film
D915-D917	223163 or	1SS133 or	R901,R902	441725114	510ohm,2W,Metal oxide film
	223205	1SS270A	R904,R914	441726204	62ohm,2W,Metal oxide film
D918	223196	EK14	R903	442520104	1ohm,1/2W,Metal oxide film
D919	224453004	MTZ30D	R519,R520	442520564	5.6ohm,1/2W,Metal oxide film
D920	224451602	MTZ16B	R517,R518	442520824	8.2ohm,1/2W,Metal oxide film
D921-D924	22380046	AM01Z	R915	442523614	360ohm,1/2W,Metal oxide film
	Coils		R907	442523914	390ohm,1/2W,Metal oxide film
L551,L552	231176	S-1.3C	R611,R612	442524714	470ohm,1/2W,Metal oxide film
			R911	442524714	470ohm,1/2W,Metal oxide film

NOTE:<D>:Only 120V model
<P>:Only 230V and 240V models
<W>:Only Worldwide model

SCHEMATIC DIAGRAM



- NOTE**
- COMPONENTS IDENTIFIED BY MARK **A** ARE CRITICAL FOR SAFETY.
 - REPLACE ONLY WITH PART NUMBER SPECIFIED.
 - VOLTAGE MEASURED WITH PART NUMBER SPECIFIED DC VOLTAGE. (NO INPUT SIGNAL)
 - ALL TRANSISTORS ARE EQUIVALENT TO 2SC1815-GR UNLESS
 - ALL PNP TRANSISTORS ARE EQUIVALENT TO 2SC1815-GR UNLESS
 - OTHERWISE NOTED
 - ELECTROLYTIC CAPACITORS ARE EQUIVALENT TO 150131 UNLESS OTHERWISE NOTED.
 - ALL CAPACITORS ARE IN P/F/UF/UF/UF UNLESS OTHERWISE NOTED.
 - ALL RESISTORS ARE IN OHMS 1/4 WATTS UNLESS OTHERWISE NOTED.
 - THE THICK LINES ON PC BOARD ARE THE PRINTING SIDE OF THE PARTS.
 - THE CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

POWER SUPPLY CIRCUIT PC BOARD(NAPS-4401-2/2A/2B)

CIRCUIT NO.	PART NO.	DESCRIPTION
R903	431523355	Δ 3.3Mohm,1/2W,Solid resistor <D>
C901	3500065A	! DE7150FZ103PAC400V/125V IS capacitor <P/W>
F901	252149	Δ 2.5A-TSC,Fuse <D>
	252070	Δ 1A-SE-EAK,Fuse <P>
F902	252070	Δ 1A-SE-EAK,Fuse <W>
F903	252149	Δ 2.5A-TSC,Fuse <W>
F901a	25050065	Δ YSH-403T,Fuseholder <D/P>
F902a,F903a	25050065	Δ YSH-403T,Fuseholder <W>
	29360626-1	Δ Fuse label <D>
	29360398	Δ Fuse rating label <P/W>
	27301216	Δ SB1925A,Cover,capacitor <P/W>

FLUORESCENT INDICATOR TUBE PC BOARD (NADG-4403-2/2A/2B)

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q701	22240628	TMP87CH70F-6020
	FL tube	
Q702	212105	BJ017GK
	Transistors	
Q703	2214220	RN1203
Q704	2213580	RN2203
	Crystal	
X701	3010192	AT-49
	Diodes	
D701	224450512	MTZ5.1B
D702	224450562	MTZ5.6B
D703-D714	223163 or	1SS133 or
	223205	1SS270A
	Coil	
L701	233409K220	NCH-1284
	Capacitors	
C701	353781009	10 μ F,50V,Elect.
C702	3020027	0.047F,5.5V,Super
C703	375524744	0.47 μ F $\pm$ 5%,50V,Plastic
C704	353780109	1 μ F,50V,Elect.
C708	353721019	100 μ F,6.3V,Elect.
	Resistor	
R732	49163104404	100kohm $\times$ 4,1/10W,Array
	Switches	
S751-S764	25035548	NPS-111-S510
	Holder	
	27190879	FL

BAND SWITCH PC BOARD(NAETC-4496-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
S770	25065267	NSS-22109,Slide switch
P701	25050525	NSCT-3P348,Socket

DIGITAL SECTION PC BOARD(NADG-4343-2)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q201	22240556R2	TL712CPS
Q202	222740745R1TO	74HC74AF
Q203	22240557R2	M65810FP
Q204	22240559R2	TMP47C241M-J444
Q206	222740046R1TO	74HCU04AF
Q207	22240554R2	SM5840ES-ET
Q208	22240555R2	μ PD6376GS-E1
Q210	22240581R2	NJM4565M
	Transistors	
Q205	2214603R2,	2SC2714-O,
	2214604R2 or	2SC2741-Y or
	2214605R2	2SC2741-G
Q209,Q211	2214373R2,	2SA1162-O,
	2214374R2 or	2SA1162-Y or
	2214375R2	2SA1162-G
Q212,Q213	2214402R2	2SC3326-B
	L.E.D	
D203	225141	SEL2213C
	Diodes	
D204,D205	223206R2	MA151K
D206	224450512	MTZ5.1B
D207	223211R2	MA151WA
	Ceramic oscillator	
X201	3010150	CST4.00MGW
	Jack	
P201	25045359	NPJ-10PDBL205
	Plug	
P202	25055369	NPLG-5P352

NOTE:
THE COMPONENTS IDENTIFIED BY MARK Δ ARE
CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK.
REPLACE ONLY WITH PART NUMBER SPECIFIED.

OR-D1 PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
U1	1A359542-2	NARF-4342-2, RF section pc board ass'y
U2	1A359543-2	NADG-4343-2, Digital section pc board ass'y
P001	2009990204	NSAS-10P0294, Socket
	28110623-1	Cabinet, bottom
	28110624	Cabinet, top
	28110625	Cabinet, receiving
	27273146	Joint
	84144025	Hexagone bolt
	863140	WW-4, Wave washer
	27170286-1	Bottom panel
	27150328A	Shield plate D
	27150327	Shield plate U
	85143116	M3.1+16F, Wood screw (Accessory)

PRINTED CIRCUIT BOARD-PARTS LIST

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q103, Q105	22240558R2	μ PC1663G-E1
Q108	222780093R2TO	TA78L09F
	Transistors	
Q101	2214311R2 or	2SC3295-A or
	2214312R2	2SC3295-B
Q102	2214611R2	2SK508-K51
Q104	2214320R2	2SC3606
Q106, Q107	2214603R2 or	2SC2714-O or
	2214604R2	2SC2714-Y
	Photo diodes	
D101, D102	225278	SPS-503A-1
	Diodes	
D104, D106	223214R2	MA717
D105, D107	223206R2	MA151K
	Coils	
L101	233433K101R2	NCH-2443
L102	233432	NCH-6075

ONKYO CORPORATION

International Division: Onarimon Yusen Bldg., 23-5, Nishi-Shimbashi 3-chome, Minato-ku,
TOKYO 105, JAPAN Tel: 03-432-6987 Fax: 03-436-6979

ONKYO U.S.A CORPORATION

200 Williams Drive, Ramsey, N.J. 07446, U.S.A.
Tel: 201-825-7950 Fax: 201-825-8150

ONKYO Europe GmbH

Hellersbergstrasse 4, 4040 Neuss WEST GERMANY
Tel: 02101 12 00 75 Fax: 02101 10 33 06

ONKYO FRANCE S.A.R.L.

Immeuble Le DIAMANT, Domaine Technologique De Saclay, 4 rue Rene Razel,
91892 SACLAY, FRANCE Tel: (1)69 41 35 10 Fax: (1)69 41 35 84